

## **REMARKS**

In the Final Office Action mailed May 30, 2007, claims 1-27 were examined and stand rejected. A declaration of the sole inventor in accordance with 37 CFR §1.131 accompanies this response (the “Supplemental Declaration”). Furthermore, facts personally known to the undersigned about the preparation and filing of the present application from June 18, 2003 through filing on September 19, 2003, are set forth in the “Patent Counsel Declaration” enclosed herewith. Reconsideration of the present application in view of the remarks that follow is respectfully requested.

### **Claim Rejections based on Prior Art**

Claims 1- 27 were rejected under 35 USC §102(e) as being anticipated by Ross et al. (App. Phys. Lett. 2003 83(6) pp1225-1227) (hereinafter “Ross”) or under 35 USC §103 as obvious by Ross et al. in view of other references. In the prior response to this obviousness rejection, remarks were provided explaining why a *prima facie* case had not been properly established, which are still believed to apply. Furthermore, additional remarks are provided as follows in reply to the “Response to Arguments” set forth in the Final Office Action. The Final Office Action asserts:

The carbon in between the nanostructures is merely a byproduct of the organometallic precursors used in forming the nanostructure, and their rejection by the nanostructures is actually what causes the spacing between the nanostructures. They are not a template or patterning device that has to be physically or chemically removed, rather, they are a byproduct of the reaction that is removed in the course of nanostructure formation.

Office Action, ¶ bridging pages 3 & 4. This assertion implies that formation of the intercolumnar carbon support during deposition somehow mutually excludes it from being a template or patterning device. To the contrary, this material defines the pattern taken by the copper-containing columns as they are formed, and accordingly is a “template or patterning device” that supports the copper regardless of its origin. Indeed, the application definition of “freestanding” does not constrain the template or patterning device to be of a “pre-existing” type or the like. The Final Office Action appears to further contend that the Ross structure is freestanding because of the manner of removal. Absent clarification, it is unclear how removal of the carbonaceous support after formation of copper columns is relevant to the inquiry. Indeed, independent claims 1, 9, and 15 recite “freestanding during formation” or “freestanding during deposition” or “freestanding during said growing,” respectively. As the images of Ross’s Fig. 1 and accompanying text reveal, the intercolumnar carbon is present during formation, deposition, and growth of the copper. Moreover, there is no indication that it “is removed in the course of nanostructure formation” as stated in the Final Office Action. Accordingly, the rejection of independent claims 1, 9, and 15 should be withdrawn.

Independent claim 9 and 21 recite a monocrystalline feature among other things. The Final Office Action asserts “as it is claimed in claim 9, Ross does meet the requirements and therefore is inherent that since it discusses the same process as the applicant, it will receive the same result” (Office Action p. 4). For an element to be inherently disclosed, it must “necessarily be present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.” In re

Robertson, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citing Continental Can Co. v. Monsanto Co., 948 F2d 1264, 1268 (Fed. Cir. 1991)). Indeed, inherency “may not be established by probabilities or possibilities . . . The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” 49 USPQ2d at 1951. The Final Office Action bases inherency on the presumption that claim 9 is the same as the Ross process. However, because monocrystallinity is a feature of the claim 9 process that the Final Office Action is trying to establish as inherent, its approach is circular – improperly contending that the Ross process is inherently monocrystalline because the claim 9 process is monocrystalline. Instead, the proper inquiry (without reference to claim 9) is whether the monocrystalline feature is a necessary consequence of the Ross disclosure. Indeed, in the metallurgical/chemical field such things are often unpredictable.

Furthermore, the Office action asserts in connection with claims 10, 22, and 27 that “circuit” broadly and reasonably discloses integrated circuits. To the contrary, an integrated circuit is a specific type of circuit not taught, suggested, or disclosed by the lone reference to “circuit” in the Ross reference. In other words, there are many types of circuits, not just integrated circuits, and “circuit” alone does not disclose specifically the integrated type. As to other features of these claims, the Office action appears to contend that various features are nothing more than “intended use” and therefore are entitled to no patentable weight. However, the recited structures are not just “intended” – structures such as a display device and a sensing device are positively recited. Moreover, as method claims, functional aspects such as “to process signals having a frequency of 100

GHz or more” are entitled to patentable weight. In fact, structural differences, while they may be present, are not a requirement for method or process claims. See, in contrast MPEP §2114 relating to functional language of apparatus and article claims. Thus, withdrawal of the rejection of these claims is further supported.

### **Declaration under 37 CFR §1.131**

The rejection asserts that the declaration submitted in the response filed last April (the “April Declaration”) provided insufficient evidence to establish diligence from a date prior to the Ross reference up to a reduction to practice. (OA page 2, ¶ 2d). To antedate a prior reference, 37 CFR 1.131(b) requires evidence submitted “to establish reduction to practice prior to the effective date of the reference, *or* conception of the invention prior to the effective date of the reference coupled with due diligence from prior to said date to a subsequent reduction to practice or to the filing of the application (*emphasis added*).” In other words, the requirements are disjunctive, such that establishing an actual reduction to practice is sufficient to overcome a reference under §1.131.

### **Actual Reduction to Practice**

Conception was corroborated to have taken place in December 2000 in the April Declaration. Subsequently, evidence of an actual reduction to practice of the inventions of independent claims 1, 9, 15, 21, and 28 was provided in micrographs dated February 28, 2001 (the “Micrographs”) (April Declaration, Exhibit E) was also acknowledged. This actual reduction to practice took place before the publication of Ross on August 11,

2003 (the “Effective Date”). Notably, the Final Office Action was silent as to this evidence and establishment of an actual reduction to practice.

Indeed, proof of actual reduction to practice as defined by MPEP §715.07 III requires a showing that (1) the apparatus actually existed and (2) worked for its intended purpose. When addressing process inventions such as the invention here, the MPEP further defines actual reduction to practice in §2138.05. Quoting *Birmingham v. Randall*, 171 F.2d 957, 80 USPQ 371, 372 (CCPA 1948), the MPEP states that an invention directed to a method “is not reduced to practice until it is established that the product made by the process is satisfactory.” A recognition and appreciation of the invention is also required. An inventor must demonstrate satisfactory results by recognizing the success of the invention “and that persons of ordinary skill in the art would have recognized [the invention] as a success, from the [] results.” *Peeler, Godfrey, and Forby v. Miller*, 535 F.2d 647, 190 USPQ 117, 122 (CCPA 1976).

In the lab notes dated February 28, 2001 (April Declaration, Exhibit D), the inventor recorded the actual existence of the copper formations and appreciated the application of the formations as nanowires, and these copper nanowires demonstrably are a satisfactory product of a process that works for its intended purpose. Subsequent activities further corroborate actual reduction to practice. For instance, a complete disclosure of the invention was formalized in the September 4, 2002 Invention Report (April Declaration, Exhibit B). The Invention Report fully describes the inventive process, the results of the process with Micrographs of the copper nanowires, XPS data confirming the composition of the copper nanowires, a description of the realized benefits of the inventive process, and includes date information for a first reduction to

practice that is consistent with invention existence and suitability for purpose. An actual reduction to practice date that proceeds a prior art reference date removes the burden of demonstrating diligence. Consequently, the rejection of at least independent claims 1, 9, 15, 21, and 28 based on the Ross reference should be withdrawn, as being overcome by this precedent actual reduction to practice.

### **Constructive Reduction to Practice**

In addition to the establishment of an actual reduction to practice date prior to the Ross reference, proper diligence also existed from a time just prior to the Effective Date through the filing of the present application. While the Final Office Action discusses dates and activities in March 2001 through February 2003, for diligence the relevant time period “begins not at the time of conception of the first conceiver but *just prior* to the entry in the field of the party who was first to reduce to practice and continues until the first conceiver reduces to practice. MPEP §2138.06, citing *Hull v. Davenport*, 90 F.2d 103, 105, 33 USPQ 506, 508 (CCPA 1937)(*emphasis* added). The present application was filed little more than five weeks later than the Effective Date of Ross on September 19, 2003 (the “Filing Date”). Therefore, to the extent diligence is required, it is only needed from just before August 11, 2003 through September 19, 2003 (the “Relevant Period”).

MPEP §2138.06 states “[t]he period during which diligence is required must be accounted for by either affirmative acts or acceptable excuses.” (citing *Rebstock v. Flouret*, 191 USPQ 342, 345 (Bd. Pat. Inter. 1975)) In describing ‘acceptable excuses,’ the MPEP highlights *Griffith v. Kanamaru*, 816 F.2d 624, 2 USPQ2d 1361, 1362 (Fed.

Cir. 1987) where the court reviewed cases regarding acceptable “excuses for inactivity including vacation extended by ill health and daily job demands.” While it is believed the affirmative acts set forth in the April Declaration should be sufficient to establish diligence for the Relevant Period, the Supplemental Declaration of the inventor and the Patent Counsel Declaration augment the April Declaration in such respects.

During the Relevant Period, a draft of the present patent application (the “Draft Application”) was being reviewed by the inventor and the staff of the University of Illinois - Office of Technology Management (the “OTM Staff”) as set forth in the April Declaration and further explained in the Supplemental Declaration. The Draft Application was sent to the inventor on or about June 15, 2003 and received by the inventor on June 27, 2003 (Supplemental Declaration, Exhibit A). The inventor completed reviewing the Draft Application on June 30, 2003 and forwarded the Draft Application with comments to the OTM Staff. (Supplemental Declaration, Exhibit B) On or about this time, it was determined that a meeting between the inventor, OTM Staff, and the outside patent counsel (in person or telephonically) should take place to discuss the outcome of the Draft Application review, which ultimately could not occur until the beginning of September 2003. This meeting was requested (at least in part) because the inventor was concerned about the pursuit of patent protection for the present application relative to other technology then in development. See, e-mail dated July 2, 2003 in the e-mail chain of Exhibit C of the Supplemental Declaration.

As is common during the Summer months, the vacation schedules of the OTM Staff prevented the meeting from taking place during the first week of July. (Supplemental Declaration, Exhibit D). Also, the outside patent counsel was serving as

an adult leader for a high adventure Boy Scout trip from early to mid-July. See, Patent Counsel Declaration. Following the return of OTM Staff and outside patent counsel, the inventor was preparing for and then traveling to present an academic paper and represent the university at the Controlled Release Society meeting in Glasgow, Scotland (Supplemental Declaration, Exhibit E) from July 17 – July 31, 2003.

After the return of the inventor, the meeting was again prevented by the absence of the outside patent counsel due to a scheduled vacation from August 1 through August 12, 2003. (Supplemental Declaration, Exhibit C; and Patent Counsel Declaration). This vacation was cut short by a medical matter in the Patent Attorney's family that further delayed availability until later August. The inventor also had begun preparation for the upcoming Fall semester (beginning August 27, 2003) in fulfillment of her employment duties as a professor, which curtailed her availability until later. (Supplemental Declaration, Exhibit F).

Coordination of the meeting was successful during early September. After a conference call on September 9, 2003 (Supplemental Declaration, Exhibit G), another draft was prepared and submitted to the inventor. Comments and revisions were made between the dates of September 12, 2003 and September 15, 2003. (Supplemental Declaration, Exhibit H). Papers for the patent application were signed by the inventor and sent to the Patent Attorney for submission on September 16, 2003, (Supplemental Declaration, Exhibit I; and Patent Counsel Declaration), and the application was filed on September 19, 2003. Accordingly, there is ample evidence regarding affirmative acts or acceptable excuses during the Relevant Period from just prior to the effective date of the Ross reference through the filing of the present patent application. Consequently, it is

respectfully submitted there are numerous reasons to withdraw the rejections and allow the claims.

### **Conclusions**

The *prima facie* case of obviousness under the Ross reference should be withdrawn. Moreover, an actual reduction to practice has been established prior to the Effective Date of the Ross reference in accordance with 37 CFR §1.131. Alternatively and additionally, due diligence from just prior to the Effective Date of the Ross reference through construction reduction to practice with the filing of the present application five weeks later has been established.

In view of the forgoing, it is believed that claims 1-27 are in condition for allowance. Reconsideration of the present application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone to address any outstanding matters concerning the present application.

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